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MISSION COMMAND IN A COMMUNICATIONS DENIED ENVIRONMENT

by

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Biography

Lieutenant Colonel Ramon Ahrens is assigned to the Air War College, Air University, Maxwell AFB, AL. He has been commissioned as a Weapon System Officer in the German Air Force in 1996. He spent most of his career in numerous flying assignments in FBW 32 Lechfeld, followed by one tour as an exchange officer with the Royal Air Force, at 31 Squadron RAF Marham, UK. Thereafter he has served as a squadron commander in TAW 33 Büchel, Germany.

Abstract

The United States armed forces are currently in the process of developing the next doctrine, Joint Concept for Access and Maneuver in the Global Commons (JAM-GC). The current concept of AirSea Battle highlights some areas of concern, especially in regards towards command and control of globally deployed troops. This paper argues that the leadership precepts of Mission Command will be beneficial over centralized control and centralized execution. Mission Command is particularly helpful in communication denied environments. This paper shows the advantages in situations where modern forces lose the ability to use satellites, computer networks, or have to operate after a nuclear attack. These three types of attack have a major influence on leadership methodologies and are mentioned in the AirSea Battle concept.

Mission Command relies on a personal contact between the echelons, in order to delegate authority and build trust between the units. The commander needs to know the capabilities and the limitations to task correctly. Also, he relies on subordinate commanders to seize the initiative and to achieve objectives in order to fulfill the commander's intent. Mission Command needs to be practiced and executed in peacetime for it to work during real world operations.

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Since the doctrine of AirSea Battle is currently under revision and is being transformed into JAM-GC, I will look at the most likely factors that might hinder command and control and how mission command might help to overcome these issues in a communication denied environment. This paper will demonstrate that short mission type orders and a clearly articulated commanders' intent will help to lead modern armed forces in future battles. First, a background section will explain the German concept of *Innere Führung* and Mission Command; then the paper will cover the current understanding of command and control as explained in the Capstone Concept for Joint Operations (CCJO) and an overview of command and control in the AirSea-Battle concept. Thereafter, this paper will lay out two cases in which Mission Command will help in leading

troops. For this, I will first look at the consequences armed forces might face when they lose control of their satellites. Next, I will demonstrate the possible problems armed forces might face when they lose computer networks, and the consequences from a potential nuclear attack. Finally, this paper will conclude that Mission Command, as a tool for a modern leader, will help in executing modern warfare.

Mission Command, or *Auftragstaktik,* as it is known in the United States armed forces, originates from the German armed forces, where it is integrated in the overarching concept of *Innere Führung* (Inner leadership). It was introduced by Helmuth von Moltke the Elder in the late 19th Century in order to "decentralize the initiative within an overall strategic design."[1] This concept gives guidelines and regulations on how to lead and interact with subordinates correctly. It is designed to create an educated citizen in uniform, who is well integrated in German society and not a separate entity.[2] Mission command is one of the pillars on which *Innere Führung* rests and is widely regarded as the form of contemporary leadership. Mission command can be characterized mainly by giving out the desired ends rather than the desired ways of a certain mission. The German armed forces employ two distinctly different ways to lead troops. One is *Führen mit Auftrag*[3] (Mission Command) and the other one is *Führen mit Befehl* (leading by orders). The latter is centralized command and centralized execution. The orders contain who does what, when and where, as well as how and why. Mission orders contain who does what and why; and, if not completely obvious, the when and where. However, Mission orders generally do not delineate how to execute the mission. They draw on the creativity and ingenuity of the subordinate and thereby create a purpose and buy-in for the individual. The subordinate will

better support the mission once they understand why they have to do something, rather than just executing an order.[4]

Mission Command relies on commanders who:

- state their intent and the desired end-state clearly and concisely

- provide their subordinates the required resources

- trust their subordinates to achieve the given end-state

- feel comfortable delegating with authority

- accept mistakes and failures

- provide flexibility to allow effective and innovative solutions.[5]

Studies on successful mission command show that the main emphasis has to be placed on the trust a commander places in his or her subordinates and supporting subordinates.[6] Building personal relationships most effectively creates this trust, as trust needs to be bi-directional. With regular and direct personal contact, both sides can be sure that they understand the commanders' intent, what the desired end states are going to be, and what the boundaries are.

The commander also needs to allow for a certain amount of mistakes and failures. As long as the subordinate is able to learn and able to apply the lessons learned from those mistakes, and they do not indicate a lack of capability, mistakes are a process of development. On top of that, mission command employs a set of reasonably short orders, which clearly lay out the commander's intent and the desired goals, giving subordinates the largest amount of latitude and flexibility to execute the mission.

As General Dempsey points out in his *Mission Command White Paper*, mission command is essentially a learned skill, which depends heavily on personal factors and efforts.[7]

Supervision on the other hand can be enhanced by technology. Having a mutually trusting relationship with subordinates will help to overcome technical difficulties, but as described later, technology can also hamper command and control and decentralized execution. Commanders need to build a relationship with their subordinates; they need to know their individual skills, have faith in their abilities and need to support them in acquiring the best available equipment for their job. If a subordinate commander does not achieve the desired military end-state, but demonstrates the desired and responsible initiative, then these failures should be accepted and regarded as a stepping block in mission command. The commander's reaction to failure is critical in regard to the mutual trust between the echelons.[8]

In the United States armed forces, the Joint Chiefs have understood the value of mission command and declared it an element of globally integrated operations in the CCJO *Joint Force 2020*. It states "globally integrated operations require a commitment to the use of mission command."[9] It also emphasizes the elements of trust, intuitive judgment, creativity and decentralization, as well as communication between the echelons. This communication is vitally important in mission command. This communication can be supported by the use of modern technology and global reach. The concept also mentions some fields of operation where mission command might not be necessarily appropriate, like nuclear operations or air traffic control, and other operations which require a high degree of synchronization.[10] The CCJO points out the fact that modern technology enables a faster and wider spread of information from the front-line unit to the leaders back in headquarters, or even globally. This spread of information could potentially lead to micromanagement. But if all services and even partners understand and utilize mission command to the full extent, it will help in seizing the initiative in globally integrated operations.

Since the CCJO is a capstone concept it does not go into too much detail about the execution of mission command in the United States armed forces. For that purpose, the Chairman of the Joint Chiefs has published the *Mission Command White Paper*, which lays out his understanding and the future challenges to implement mission command in the United States forces, as well as its benefits. The *White Paper* was published only five months before the capstone concept, so it is easy to see the building block approach for the *Joint Force 2020*. It emphasizes the decentralized operations of the future, with smaller units operating simultaneously across the globe and in multiple domains at once: land, air, sea, space and cyberspace. With increasing speed and proliferation of technology, mission command will provide the best means for the "art of command and the science of control."[11] The commander must understand the desired military end-states, be able to explain these to his subordinates, breakout the required missions, assign these to the right people and then trust them in their execution of the mission. The subordinates have to trust their commander will execute the right amount of control in order to support them without being over controlling or micromanaging.[12] During the execution phase the commander is the free to choose his position on the battlefield to best support and supervise his subordinates. This position might be his office with all the modern technology available and video feeds to every computer; but an over reliance on modern technology and leadership from behind the "plasma screen" should be avoided. This phenomenon leads to mistrust and a general feeling of a lack of direction.[13] This was the experience the Israeli Army had during the Second Lebanon war, as described by Eitan Shamir, an expert on mission command and its variations in different militaries. Shamir reminds us that the Israeli military is generally well trained in regards to mission command. Obviously, lesser trained organizations will be at an ever greater disadvantage unless adequately trained.

Now I will look at the most likely scenarios as laid out in the AirSea Battle concept and the resulting threats towards modern command and control, anti-satellite warfare, cyber-attack, and nuclear attack. As AirSea Battle is a concept and not a doctrine or a strategy, it does not go into too much detail on execution, but rather highlights the points to consider in order to counteract Anti-Access/Area-Denial strategies. [14] It describes the new challenges in the two main areas of interest, the Persian Gulf and the Pacific Region. In both areas, a potential adversary tries to limit the influence of the United States—Iran in the Gulf Region, and China in the Pacific. By increasing the range of the weaponry and sensors they both try to deny access to the area and threaten formerly safe bases in allied countries.[15] China's People's Liberation Army was impressed by the swift and overwhelming execution of the Gulf War in 1991, especially in precision weaponry and the limitation of civilian casualties. They have updated and upgraded their military capabilities since 1996 and focused on modern Anti Access/Area Denial systems. "Their investments in cyber and anti-satellite warfare, anti-air and anti-ship weaponry, and ballistic missiles could threaten America's primary way to project power … in the Pacific."[16] One vulnerable node that China identified was the United States' reliance on satellites for its precision. Also the current paradigm of peaceful use of outer space and space-based platforms has come under threat, as the Chinese demonstrated their capability to kinetically destroy an inoperative weather satellite in 2007 and further employed ground based anti-satellite (ASAT) laser system to "dazzle" US imagery satellites in 2006.[17]

Modern technologically advanced armed forces are highly dependent on satellites. They are used for communication purposes, reconnaissance, targeting, control of unmanned aerial vehicles (UAV), etc. For forward deployed forces, this use of satellites has developed from an

enabler, like the use of Global Positioning System (GPS) or satellite imagery, to a necessity, like the over-the-horizon communications and control of UAVs. Whilst China has already proven in 2007 her capability and willingness to attack satellites, it is safe to assume that other states have that kind of capability as well.[18] Especially since the United States demonstrated its first successful anti-satellite launch as early as 1985. The creation of "space debris" however has led to an agreement not to conduct further tests in peacetime.[19] But it can still be assumed that it is in more countries' strategy to target enemy satellites if it becomes necessary to do so. Certainly the U.S., Russia, China and Israel have demonstrated the capability, and India declared the intent of creating an ASAT capability.[20] Nations do not need to resort to the ultimate destruction of a satellite and the thereby creation of space debris, which in turn might damage their own satellites. Instead, they can neutralize or deny the use of satellites, for example with GPS jammers, or limit the use of the uplink to the satellite.

Studies indicate that most of the recent military operations begin with a coordinated, well-planned and synchronized initial attack on the integrated air defense systems and command and control installations of the opposing power.[21] Such a synchronized attack, by a variety of missiles, aircraft, and ground troops relies heavily on Time-Phased Force and Deployment Data transmitted by computer networks that rely on satellites. Many other combat systems rely on satellite control such as GPS data in order to guide cruise missiles or other GPS guided ammunition to the target area, and satellite links to fly UAVs, for target identification or post attack reconnaissance. These capabilities will be highly diminished against an enemy with highly evolved A2/AD capabilities.[22] Whilst the denial of the use of satellites could limit our command and control, it most likely will not render it impossible to execute the missions according to plan.

Modern forces might have to resort to different means of communication, rely on allied services for their satellite imagery, or use older material, but the mission will likely still be executable. Reliance on the subordinate leaders' ability to improvise and to overcome difficulties will be critical to executing mission command orders. Military campaigns might have to be executed on a more unitary level with higher flexibility and less centralized control.

The next command and control system to be discussed in the AirSea Battle concept is computer networks. These networks have been established to pass information quickly up and down the chain of command. With different number of participants in alliances and coalitions, different networks have been built. This diverse environment makes it more difficult to keep these computer networks secure. To mitigate the possibility of cyber-attacks, networks must be either an isolated network, which reduces the possibility for outsiders to enter the network, but also restricts the communication to outsiders such as allies or coalition partners. Alternatively, the network can use encryption, which has to be disseminated between the users of the network. This process leaves the network vulnerable to enemy exploitation.

The effects of cyber-attacks can be categorized into six different classes.

a) Interruption: part of the network become unusable for some specified period of time,

b) Modification: an attacker causes a modification of information,

c) Degradation: causes degradation in the performance of the network,

d) Fabrication: information is inserted into the network,

e) Interception: an attacker takes advantage of leaked information,

f) Unauthorized Use: an attacker uses the network for his own purpose.[23]

Some of these attacks are more difficult to detect than others; some will have less effect than others. Yet, all forms of cyber-attacks are undesirable. Unfortunately, other nations, like China, are expanding their military capabilities in the cyber domain rapidly and vigorously. Even if China is denying involvement in the recent cyber-attacks on US government networks, they are not denying their increasing capabilities.[24] "Since 2001, China's cyber activities have increased greatly in volume and sophistication. A Peoples Liberation Army unit tasked with penetrating foreign computer networks is believed to have begun operation in 2006."[25] This kind of capability is not limited to one country, since the technology and the knowledge is readily accessible, a cyber-attack can come from anywhere in the world, as long as the adversaries have a computer and access to the network.

Globally deployed forces rely on computer networks; this dependence leads to cyber-attacks on a daily basis. "China has been publicly accused … of sponsoring hundreds of suspicious hacking incidents each day … to steal technology, gather intelligence, probe defenses and install "sleeper" software." [26] These enemy capabilities might render 1000 page Operational orders, describing every minute detail of the operation, as was done in Operation Desert Storm, obsolete.[27] Armed forces should embrace mission command and disseminate the Commander's Intent and rely on shorter orders and the ingenuity of the subordinate commanders in the field.

The final threat to forward deployed forces, which is mentioned in the AirSea Battle concept, is the threat of surface-to-surface missiles, potentially carrying nuclear warheads. Since the end of the Cold War, the "threat of all-out nuclear war has diminished, [but] the likelihood that nuclear weapons may be used in some way is increasing."[28] Scholars like Schelling and Larsen will agree that its less likely going to be an exchange of thousands of nuclear warheads,

but instead a limited, regional use.[29] With all the commitments and bilateral agreements that have been signed, the United States and its allies might find themselves in a scenario, where nuclear weapons might be introduced again. Nuclear proliferation is still a large concern, as well as the threat of nuclear terrorism. Looking at the current nuclear weapon states, as well as those states that are trying to acquire nuclear capabilities, there are a number of scenarios which could lead to the use of nuclear weapons by the opposing force. Several of these situations involve China, Russia, Iran, or North Korea. Despite the fact that the heads of state of China and Taiwan recently had a meeting for the first time,[30] one of China's core interests remains national reunification.[31] While they are willing to achieve this goal by peaceful means, it remains to be seen how much patience the Chinese government has in this regard. The bilateral security agreement between Taiwan and the United States could potentially draw US forces into such a conflict, as well as a conflict over territory disputes in the South China Sea or with the rogue nation of North Korea. All of these hotspots have the potential to produce an exchange of nuclear warheads. While China has agreed to the No-First-Use policy in regard to nuclear weapons, they also stated that they would use their nuclear arsenal in self-defense, if a conventional force overwhelmingly threatens them.[32]

Russia, on the other hand, has in recent times put more emphasis on tactical nuclear weapons and leaked data about a nuclear torpedo to the media.[33] This announcement was in response to the European Missile Defense System, which was being planned to be built in Eastern Europe, close to the Russian zone of influence, thereby threatening Russian deterrence capabilities. Other scenarios involving the Russians are increasing aggression and expansion by Russia and therefore a concerted military measure against Russia by NATO and its allies. The Russian response could be either a limited nuclear attack on NATO to demonstrate its

willingness and ability to defend itself or the use of a nuclear-powered electromagnetic pulse (EMP) device.[34] This scenario would most likely disable NATO's command and control system further requiring the use of mission command.

Since the end of the Cold War, the focus of the western militaries has moved further and further away from a potential nuclear war, be it limited or unlimited, and more towards asymmetric warfare and technology-centric warfare. This technological and conventional superiority might bring some opponents to the conclusion the only way to beat the western alliances is by going nuclear. This situation could threaten most of modern technology, because hardening technology against an EMP was not the focus of research and development, as it was during the Cold War years. With the development of JAM-GC, the lessons learned and the doctrines of the Cold War need to be revisited.

Modern technologies are very helpful tools in executing command and control, but they also offer vulnerable nodes to worldwide-deployed forces and offer tools to facilitate micromanagement. If mission command is embraced throughout the force and everybody understands the commander's intent, a dropout of communication on any level of command is not insurmountable to the force and the operation can still be executed, though possibly degraded. The capabilities, which are currently provided by satellites, such as SATCOM, ISR, Timing, Navigation, and control of UAVs, among many, should be used as force enablers. These capabilities should not drive the decision on the style of leadership. Instead, they should enhance leadership through increased awareness.

With all the information which can be gathered in headquarters in nearly real time, it is very easy to become over-controlling and micromanaging. In order for Mission Command to

work, there needs to be a trusting relationship between the echelon commanders, or at least intuitive communication between them. But some leadership styles might be impacted more by the drop-out of satellite technology than others. This paper will now analyze individual capabilities and how they influence command and control.

Satellite Communication (SATCOM) is used to improve the communication between the deployed forces and the associated headquarters. It keeps communication independent from the local existing network and improves communication in inhospitable terrain. Since it is an independent network, SATCOM makes it harder for the enemy to exploit information. However, it is still possible to jam or spoof SATCOM. Interference can be mitigated by a robust plan for alternative means of communication like land lines, radio, or relay aircraft, to extend the range of communication. Communication is crucial for the commander to get feedback and to issue orders to his troops. According to a Naval Post Graduate strategic studies paper, even the US Marines, who are historically more inclined towards the use of Mission Command, are over reliant on satellite communication and their reach back towards higher headquarters.[35]

With Mission Command, the commander can choose his position on the battlefield in order to supervise and support his troops best. However, there is still a requirement for long-range communication. SATCOM is not the panacea for communication issues; therefore, it always necessary to have a backup plan. But the need for extensive use of SATCOM is reduced when using Mission Command, since you rely on the intuition and ingenuity of your subordinate leadership to achieve the desired goals.

The next system that uses satellite technology is GPS. GPS can be used for navigation, targeting, or timing. If the GPS is jammed in a certain area, it might decrease allied accuracy by such a margin that its use is no longer acceptable for allied forces. Since synchronized operations

are usually desired by the force commander, timing is important. However, GPS satellites are not the only means of achieving synchronized operations. Synchronization without GPS will require more practice and prior coordination; admittedly, the chances for this training have been reduced in times of force reductions and budget constraints.[36] The issue of accuracy during GPS jamming can be mitigated by switching to different means of targeting such as laser guided munitions, ballistic munitions, or in the case of cruise missiles, by ground comparison.[37] These methods are, however, more weather dependent, increase the workload for the operators and therefore might prolong operations. In regards to command and control, the commander needs to articulate his intent clearly, and state his priorities, such as time, accuracy, or collateral damage in order for subordinate unit to choose the appropriate weapon to achieve the intent.

There is a lot of information and intelligence that can be gathered from satellites to enhance the common operating picture in headquarters. It ranges from weather and environmental monitoring, to missile warning and ISR.[38] All this information can very easily lead to centralized command, due to the impression of omniscience. As seen in the Israeli Defense Forces (IDF) during the Second Lebanon War in 2006, a force that is comparatively well trained in mission command, the IDF became over reliant on technology and their commanders did not lead from the front. IDF commanders were accused of fighting the battles from the headquarters, watching and directing the troops from behind the "plasma-screen."[39] This command environment led to micro-management, mistrust, and a decrease of independence and decision-making abilities.[40] The available technology is able to create an information overload, but can not overcome the uncertainty of military operations.[41] Therefore, the commander must chose his position during operations wisely in order to oversee operations.

Also, he must demonstrate trust in the abilities of his subordinate commanders. Mission Command will support the operation, even if the informational link is lost, by creating the trust between the echelons and the capabilities to cope with uncertainties.

Centralized control and centralized execution becomes increasingly difficult in times of cyber attacks, as you depend on near-real-time information. Although it might still be possible to receive the information via other means, this effort will use up valuable time for the execution and the mission will not be executed as planned. If you rely on mission command, and therefore the flexibility and ingenuity of your subordinate leadership, they will still be able to execute the mission. However, a high level of trust must exist for them to make their own decisions in an uncertain environment.

If the enemy, on the other hand, uses his access to modify allied information and orders, it might render the whole plan ineffective, especially in centralized execution. This type of cyber intrusion is a lot harder to identify, especially in a combined operation, due to its complexity. Again, Mission Command with shorter orders and personal contact between the echelons can better identify and overcome these changes, because the commander's intent is unlikely to change from one day to the next.

A fabrication cyber-attack is when the opponent creates information on the allied network. It is in the same realm as modification of information. In some cases, fabrication attacks may be easier to catch during centralized control, because orders are written in a very regulated fashion and it is unlikely the opponent will insert information in all the right places. But if he does, he can cause a lot of confusion during the execution of the operation. However, if the inserted information is not inline with the commander's intent and goals, during mission

command there might be the opportunity for the subordinate leaders to reach back and question the information.

If the enemy only uses his access to allied networks to intercept and explore our own information, he could prepare a defense or be forewarned of our actions, thereby reducing our own effectiveness. Due to the large amounts of users in a network the presence of an unwanted user could go undetected. Giving mission type orders and not too much detail in the Operations Order (OpOrder) will help in that regard, because the enemy cannot read the OpOrder like the detailed directions of a screenplay. Overall mission command will help decrease the effects of a cyber-attack, since it enhances the trust between the echelons, the communication between commanders and reduces the dependence on computer networks.

An attack with nuclear weapons combines the two previously described situations and therefore elevates the problems to a new level. But due to EMP interfering with electronics, computer networks, and communication, command and control becomes a lot more commander-centric. Forces are expected to improvise and fall back on techniques used and rehearsed during the Cold War era. Since the warning-times have decreased due to the larger range of missiles available to Iran, China and Russia, the communication between the echelons needs to be established in peacetime. Additionally, commander's guidance concerning relocation, alternative means of communication, dispersal of forces, etc. need to be stated, in order to act appropriately during or after a nuclear attack on forward deployed forces.

Modern technology and technology centric armies might prefer centralized control because it is easier for the commander to get the information into headquarters and the illusion of omniscience is created behind the plasma screen. But technology cannot fully lift the fog of war. The commander needs to rely on subordinate leaders to seize the initiative and achieve objectives, in order to achieve the overall strategic goal. In an era of budgetary constraints and shrinking forces, mistakes are not allowed, since they cost money. This environment increases the hesitance to relinquish control to others and to delegate authority. In order to create the trust between echelons, commanders should be left in place longer, to build personal relationships and the element of trust. Ideally, units must exercise and train together using Mission Command before commencing operations. But if the relationship does not develop, the subordinate commander must be able to be replaced without fear of career reprimands. Some amount of failure must be allowed in order to learn and develop under the precepts of Mission Command.

Abbreviations

A2/AD	Anti-Access/Area Denial
ASAT	Anti-Satellite
CCJO	Capstone Concept for Joint Operations
EMP	Electro-Magnetic Pulse
GPS	Global Positioning System
IDF	Israeli Defense Force
ISR	Intelligence, Surveillance and Reconnaissance
JAM-GC	Joint Concept for Access and Maneuver in the Global Commons
RPA	Remotely Piloted Aircraft
SATCOM	Satellite Communication
UAV	Unmanned Aerial Vehicle

Endnotes

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[39] Eitan Shamir, *Transforming Command – The Pursuit of Mission Command in the U.S., British and Israeli Armies*, p. 152

[40] Ibid, p. 167

[41] Ibid, p. 167

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